NOTES

A STATISTICAL POINT IN RICARDIAN THEORY OF GOLD MOVEMENTS

Mr. Whitaker, in the *Quarterly Journal of Economics,* February, 1904, treating of "The International Movement of Specie," presented certain statistical data which, it was claimed, verified the Ricardian theory. There is no intention to discuss in this note the theoretical questions raised by Mr. Whitaker. The only purpose here is to inquire into the value of the statistical data employed in the verification of the Ricardian theory.

Mr. Whitaker states the Ricardian theory of the international movement of specie briefly as follows:

> The theory does not at all assert that prices maintain a different level in different countries. The stages in the process described by the doctrine are stated separately as (1) gold inflow, (2) rise of prices, (3) extra import of goods, (4) counterbalancing gold outflow. It is not meant that this process takes place in several disjointed steps with a certain interval of time between each. The steps are disjointed only in the analysis. As the first inflow sets in, while it is running, the resisting price forces are generating.[1]

In order to substantiate this theory, a series of charts was presented. Chart I of this series

> shows the course of the loans and discounts of the Associated Banks of New York City during a period of six months, from December 13, 1902, to May 9, 1903, in relation to the reserves of these banks for the same period. But, as indicated on the margin, the course of the reserves for any given series of dates is placed directly under that of the loans for a period just three weeks later.[2]

The author then continues:

> The movement of the loans is (in part) a consequence of the movement of the reserves; and it was found that, with remarkable uniformity, it takes three weeks for the change in reserves to work their effect on the loans.[2]

The argument that surplus reserves cause loans, and hence an expansion of credit is presented as a link in the chain of sequence by which the inflow of gold from foreign countries affects the price-level.

[1] *Quarterly Journal of Economics,* Vol. XVIII, p. 238.

[2] *Ibid.,* p. 243.

It may be noted that the data above mentioned were given for a period of expansion in business activity. During such a period capital of every kind is being well used, and the correspondence between the reserves and the amount of loans pointed out by Mr. Whitaker would be expected. In the New York banks from which the data are taken the lower limit of the ratio of bank reserves to liabilities is fixed by law at 25 per cent. and in a period of business expansion the bank does not keep a reserve much in excess of this minimum. If the bank needs more money for increasing loans, this may be had by cashing some of its assets, or by borrowing cash at home or abroad on collateral of a stable and recognized value. The question may be raised whether the bank reserves are secured to meet the need, or the need is created by the automatic appearance of the bank reserves and the lowering of the rate of discount.
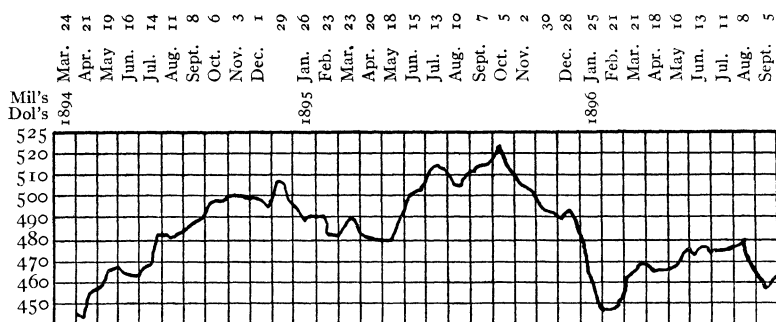
TABLE I

RATIO OF RESERVES TO DEPOSITS IN THE NEW YORK CLEARING HOUSE BANKS IN THE YEARS 1902 AND 1894[3]

1902		1894	
Jan. 4........ 25.8	July 5.......26.1	Jan. 6 ......41.2	July 7........37.3
26.4	26.3	42.5	37.5
27.0	26.7	43.9	37.6
27.7	26.6	44.9	37.0
Feb. 1........ 27.7	Aug. 2.......26.4	Feb. 3......45.2	Aug. 4.......36.6
26.8	25.9	41.0	36.5
26.3	25.7	39.1	36.6
26.2	26.0	39.1	36.5
Mar. 1.......25.9	Sept. 6 .....25.0	Mar. 3......39.3	Sept. 1.......36.2
25.4	25.1	39.2	35.6
25.3	24.8	39.3	35.2
25.3	25.4	39.5	35.2
25.7	Oct. 4......25.2	40.3	35.4
Apr. 5........ 25.3	25.2	Apr. 7 ......39.5	Oct.6........35.1
25.5	25.6	39.3	35.3
25.7	27.0	39.4	35.7
26.0	Nov. 1......27.4	39.5	35.7
May 3........ 25.8	27.0	May 5......39.3	Nov. 3.......35.4
25.9	27.1	38.9	35.4
26.5	27.2	38.6	35.6
26.3	26.8	38.5	36.1
June 7........ 26.2	Dec. 6......26.1	June 2......38.6	Dec. 1.......34.0
26.4	26.0	38.5	30.8
26.3	25.9	38.3	30.9
26.4	25.8	38.3	31.1
		38.1	

[3] The data from which these ratios were calculated are found in the weekly *Commercial and Financial Chronicle*. The data for Chart I were taken from the same journal.

CHART I.—LOANS, DISCOUNTS AND RESERVES OF NEW YORK CLEARING-HOUSE BANKS

LOANS AND DISCOUNTS NEW YORK CLEARING-HOUSE BANKS
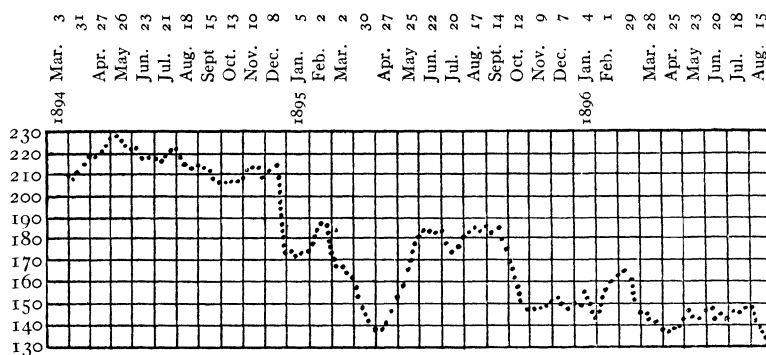
RESERVE OF SAME BANKS

Chart I together with Table I raises anew the question of the relation of bank reserves to price fluctuations. If the calculation of the percentages of reserves, as made in Table I, be made for the longer period, January 1, 1894, to September 1, 1898, the percentages will be found to vary between 27 and 45.2, averaging approximately 32. During this period of about four years there might have been at any time an expansion of credit and a rise of prices, so far as reserves are concerned. The fact that no pronounced expansion of credit occurred in this period seems to discredit Mr. Whitaker's conclusion that, in general, surplus reserves create an expansion of credit and rise of prices.

The loan item, as quoted in the *Commercial and Financial Chronicle,* shows that a pronounced expansion of credit began about July, 1897. Yet the reserve item did not vary widely from two hundred millions of dollars during the period between the months of January and September of this year. It seems fairly

clear that it was not the surplus reserves which created the expansion of credit and rise of prices beginning at this time. Indeed, it has been pointed out by another author [4] that this expansion of business was initiated by a widening of demand due, in part, to the war with Spain. It has also been shown that the large crops in this country, accompanied by small crops abroad, favored the initiation of a credit expansion. [5] The expansion of demand for American products was based, not on large bank reserves, but on an increased demand from the ultimate consumers of American wares.
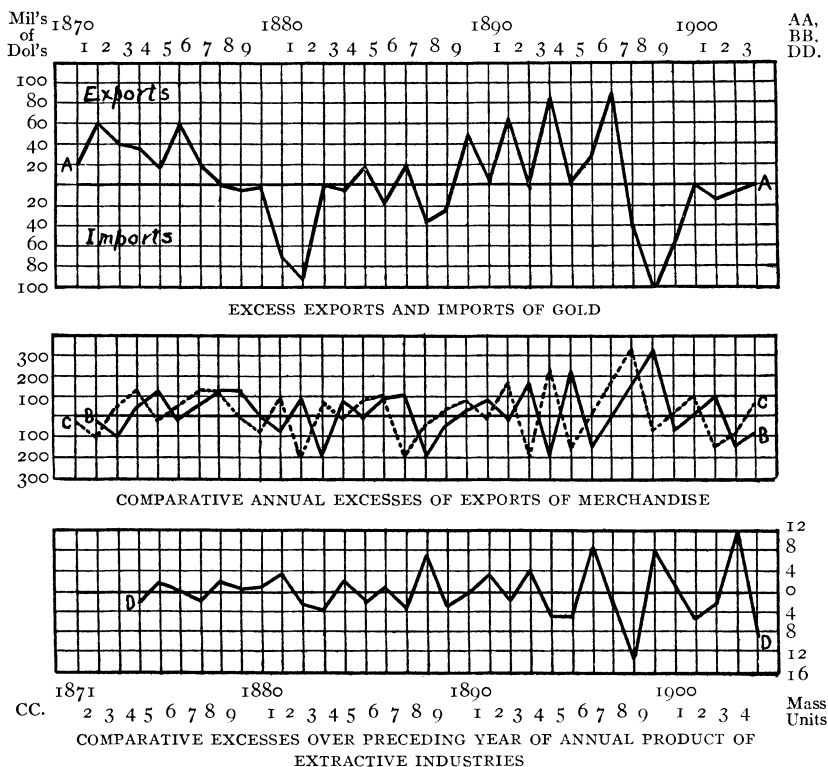
Does not the theory proposed by Mr. Whitaker assign an undue importance to bank reserves as a cause of inflations of credit? Was Mr. Whitaker justified in claiming that the data from the New York banks, for a period of only six months, were sufficient to justify his important conclusions from Chart I? If there is any truth in his theory, does it not require restatement and modification?

But Chart I of Mr. Whitaker's article was presented by him as only indirectly corroborative of the Ricardian theory. The specific evidence in confirmation of the theory was presented in Chart II, drawn to show the reaction of gold movements on merchandise movements for the years 1889–1903. This chart (II) is designed to prove that increased exports of gold are accompanied by a fall of prices, which in the succeeding year is followed by an increased export of merchandise. Likewise, a fall in the exports of gold, or an increase in the imports of gold, is accompanied by a rise in prices, which in the succeeding year is followed by a fall in the exports of merchandise. There was accordingly a line representing the exports and imports of gold, and beneath this line another representing the increase or decrease of the exports of merchandise compared with the excess of the year just preceding. The latter line was so drawn that every section was directly under the sections of the first line for the year preceding. According to the Ricardian theory, a rise in the exports of gold would be accompanied by a fall of prices, and there would consequently be a corresponding rise in the exports of merchandise in the succeeding year. There should therefore be a correspondence in the up-and-down movement of the lines drawn as above indicated. In such a correspondence Mr. Whitaker found satisfactory verification of the Ricardian theory.

[4] Veblen, *Business Enterprise,* p. 194, n. 1.

[5] Andrews, "The Influence of the Crops upon Business in America," *Quarterly Journal of Economics,* May, 1906.

CHART II.—Relation of Gold and Merchandise Movements

EXCESS EXPORTS AND IMPORTS OF GOLD

COMPARATIVE ANNUAL EXCESSES OF EXPORTS OF MERCHANDISE

COMPARATIVE EXCESSES OVER PRECEDING YEAR OF ANNUAL PRODUCT OF
EXTRACTIVE INDUSTRIES

AA.—Curve of U. S. net gold exports or imports in millions of dollars.
BB.—Curve of U. S. net excess of exports or imports of merchandise compared with the excess of the
    preceding year.
CC.—The same as BB, except drawn to time schedule below chart.
DD.—Curve showing the increase or decrease of each year's product of cotton, wheat, pig iron, and steel
    compared with the excess of the preceding year.
All curves except CC are drawn to time schedule above chart.

Instead of taking the period 1889–1903, let us take the longer
period 1870–1903. In our Chart II, given herewith, we present
from the same data and in the same position, the lines AA and CC,
which were drawn in Mr. Whitaker's Chart II. There is added,
however, the line BB plotted from the same data as the line CC, but
by the time schedule above the chart.

It will be observed that there is almost a uniform lack of corre-
spondence in the up-and-down movements of the two lines AA and
BB. The explanation of these data seems rather simple, and does
not require the round-about theory proposed by Mr. Whitaker.
When the excess of exports of commodities increases, the excess of

TABLE II

From Which Chart II Is Made (000,000 Omitted)

Year	A Net Excess of Gold Movement, Imports (−)	B Increase or Decrease (−) of Each Year's Excess of Merchandise. Exports Compared with Excess of Preceding Year.	D[6] Products of Extractive Industries
1870	21		
1871	60	− 34	
1872	41	− 105	− 2
1873	36	63	2
1874	14	138	1
1875	53	− 38	− 2
1876	23	34	2
1877	0	136	1
1878	− 4	107	0
1879	− 1	− 5	4
1880	− 77	− 85	− 3
1881	− 97	92	− 4
1882	− 2	− 238	3
1883	− 6	75	− 2
1884	18	− 28	1
1885	− 18	76	− 3
1886	22	95	7
1887	− 33	− 220	− 3
1888	− 25	− 52	− 1
1889	50	25	3
1890	4	72	− 2
1891	68	− 30	5
1892	0	164	− 6
1893	87	− 222	− 6
1894	5	257	8
1895	30	− 161	3
1896	89	26	− 9
1897	− 45	186	9
1898	− 105	329	2
1899	− 51	− 85	− 6
1900	4	14	− 3
1901	− 13	121	11
1902	− 3	− 186	− 9
1903	2	− 85	—

[6] Column D is expressed in annual increases over excesses of preceding year. The products of extractive industries taken for the chart are cotton, wheat, pig iron, and steel. After selecting for units a bale of cotton, fifty bushels of wheat, two tons of iron, and two tons of steel, respectively, the sum of the amounts of the annual output of these four commodities was taken for the annual product of extractive industries. The numbers were then expressed in millions, and the comparative increase of the output of each year over the excess of the preceding year was calculated as indicated under B. The data were taken from the *Monthly Summary of Commerce and Finance* for the first quarter of the fiscal year ending June 30, 1904. For the purposes of the chart, the annual output of extractive industries for each year was considered as belonging to the succeeding fiscal year.

exports of gold decreases at the same time, because there is a larger balance due us from foreign countries. The fact that there is this necessary and natural lack of correspondence, in the up-and-down movements of the lines *AA* and *BB,* would require some appearance of correspondence if the line *BB* were moved back one year to the position *CC* which was assigned the line in Mr. Whitaker's chart. But there would be just as good a correspondence if the line *BB* were moved forward instead of back one year, as suggested by Mr. Whitaker. By moving the data forward one year the correspondence would tend to show that gold movements tend to follow merchandise movements, which is just the reverse of Mr. Whitaker's conclusion. The data, therefore, seem to be worth nothing for Mr. Whitaker's purposes.

But, to examine this point further, let the line *DD* be drawn to represent the annual product of cotton, wheat, iron, and steel in the United States. The product of each year is considered as belonging to the succeeding fiscal year (ending June 30), as its exportation will probably fall in this year. There appears here some relation between the variation in production of our chief extractive products and the variation in exports. There can be no exact correspondence here because the chart does not take into consideration the productiveness of foreign countries, and the special conditions of the financial panics during this period. At least, this line throws some light on the following statement made in the article under review:

> But as the excess of exports increased through these years, it rose by jerks. In a nutshell, it is these jerks that we find correlated with the gold movement. The explanation, therefore, runs as follows: Dynamical influences (of production and commerce, entirely independent of the Ricardian specie forces) led our excess of exports to increase generally through the period. But, while pursuing this general line, the excess swings from side to side along the course. . . . . Along the dynamical path of our foreign commerce at one time our exports swing too far in excess even of our expanding debits, then again swing below them. Thus they produce flows of gold, at one time to the country and again from it. . . . . All is accomplished by gentle movements of the home price-level relatively to foreign price-levels.[7]

But, from an observation of line *DD* in our Chart II, it appears that the variation in the production of wealth in this country has a

[7] *Quarterly Journal of Economics,* Vol. XVIII, pp. 252, 253.

"jerky" nature, corresponding somewhat to the "jerky" nature of the line representing the imports and exports of gold. The variation in a country's production of wealth suitable for exportation may, therefore, so far as the data are concerned, be looked upon as the dominant force in determining the variations in exports of goods and exports of gold. The data presented in Chart II seem to be without value for the purpose of verifying the Ricardian theory.

There is no intention, in this note, to set up a positive theory of the international movement of specie. The only purpose is a criticism of the use of certain data for the verification of the Ricardian theory, and to show that the same data might be used, perhaps more convincingly, for the purposes of casting some doubt on its sufficiency.

SPURGEON BELL

UNIVERSITY OF CHICAGO